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Quantitative analysis of injury characteristics in victims of interpersonal violence: An emergency department perspective

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ABSTRACT

Violence runs into the fabric of society. In recent years, violence has been identified as an important health problem in industrialised societies. In the present study, conducted to analyze injury characteristics, 813 victims of interpersonal violence presenting to emergency department at a Government Medical College and Hospital from a major city in Central India were interviewed and examined over a period of one year. Central to the quantitative analysis of the data collected was the extraction of specific injury characteristics from the sample population. The group included 606 men and 207 females, most of them were resident of urban areas, aged between 11 and 30 years. Most of attacks occurred at nights, with minimal seasonal variation. Males were more commonly attacked outdoors by a single stranger male while females were mostly attacked indoors by spouse. Blunt trauma was more commonly seen in females as compared to males. Head neck and face region was the most preferred anatomical site by the assailants. Hard and blunt weapons were used more commonly at homes (184 of 269 incidents) than at streets (301 of 561 incidents). Sharp edged and pointed weapons were most commonly used at streets. Firearms were rarely used. Occurrence of physical assaults in this region more or less follows the pattern seen in other parts of the world with local and socio-cultural differences that need to be further delved into and considered during the planning and implementation of injury prevention programs.

1. Introduction

The history of trauma parallels the history of the evolution of man, with his aggressive instincts, creative ability and endless ambition to conquer the environment without regard to the price he must pay to achieve his goals.[1] According to the Global Burden of Disease study 2010 conducted by the Institute for Health Metrics and Evaluation (IHME), University of Washington all forms of violence accounted for a total 621,950,00 Disease Affected Life Years (DALY) globally with an increase of 26.4% from 1990 to 2010.[2] Nevertheless, patterns of violence and its related risk factors vary in different parts of the world according to financial and legal differences and availability of weapons.[3] The National Crimes Records Bureau (NCRB), Ministry of Home Affairs, Government of India 2011 report states that a total of 256,329 violent crimes were reported in India in year 2011 and the crimes under Indian Penal Code (IPC) have registered a 2.5% rise in 2011 over previous year.[4] The assessment and documentation of all injuries a victim sustains as a result of violence, as well as the proper securing of forensic evidence and expert testimony in a court of law, have long been essential and grounded components of legal medicine. Standard procedures or protocols for the collection and documentation of evidence have been well established in the literature and can be found in clinical forensic medicine textbooks and journals.[5] A detailed evaluation of characteristics of the injuries due to interpersonal violence in a developing country like India has not been described previously. Hence the present study was designed to demonstrate the distribution of mechanical injuries sustained as a result of interpersonal violence.

2. Materials and methods

2.1. Selection criteria

For the time frame of November 1st, 2012 until October 31st, 2013, all forensic medical experts on duty completed a

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standardized questionnaire for every consenting victim ($n = 813$) of interpersonal violence (age 11 years and older) presenting at the emergency department. The interview was completed in addition to all other forensic documentation and examined the following variables: basic demographics of victim, name of the agency who has brought the victim, place and time of the incident, form of violence and intention behind the assault, gender and number of assailants involved, relation between the perpetrator and the victim and weapon used. Objective assessment of the injuries was done. Cases where the patients were unable to answer because of memory loss or diminished consciousness the details were obtained from people accompanying them. History of alcohol intake by the victim was recorded if the patients admitted to having been drinking or if it was felt that he or she was under influence of alcohol on clinical grounds.

2.2. Study design

After the completion of a plausibility control test with logically correlated variables, all data collected by means of the standardized questionnaire was checked, coded, entered, and analyzed using the statistical software Medcalc 13.1.0.0. Group differences were examined using categorical and ordinal scaled data sets and compared by the Chi- squared test. *P* value less than 0.05 was considered as statistically significant.

3. Results

3.1. The victims

Between November 1st 2012 to October 31st 2013 a total of 813 victims of violent crime were examined at the Emergency Department at Indira Gandhi Government Medical College, Nagpur. The standardized questionnaire was completed for 813 victims aged 11 years and older. Of these victims 606 (74%) were males and 207 (26%) were females. The victims' ages were categorized by means of 5-year intervals. The peak age group for women was 25–30 years and that for men was 20–25 years. As many as 471 (78%) males and 164 (79%) females belonged to urban locality ($p = 0.723$) (Table 1).

3.2. Time of incident

Most of the victims were attacked during night hours – 365 (60%) males and 118 (57%) females ($p = 0.4629$). When the seasonal variations in the rate of victims were analyzed using Chi squared test for linear trends no statistically significant results were obtained ($p = 0.563$) (Fig. 1). As far as the numbers of victims reporting per month were considered peak reporting coincided with major festivals and the New Year eve.

3.3. Time of reporting

542 (89%) male victims were brought to emergency department within 24 h of the incident of attack while only 59 (28%) females were able to make it within first 24 h ($p < 0.0001$) (Table 1).

3.4. The assailant

The majority of male victims ($n = 378$, 62.4%) reported having been physically assaulted by a stranger male while most of females ($n = 98$, 47.3%) were victims of spouse perpetrated assault. In 59 (28.5%) cases females were subjected to violent assaults by strangers ($p < 0.0001$). Single assailant was involved in attacking 385 (63.6%) male and 168 (81.1%) female victims ($p < 0.0001$).

Table 1
Injury constellations with respect to locality, time, assailant, predisposing factors, place, kind and site of injury & kind of weapon.

Parameter	Males		Females		*P* value
	n	%	*n*	%	
Locality					
Urban	471	78.8	164	79.3	0.723
Rural	135	22.2	43	20.7	
Time of incident					
Day	241	39.7	89	42.9	0.4629
Night	365	60.3	118	57	
Seasonal variation					
Winter	221	36.4	72	34.8	0.563
Summer	213	35.2	72	34.8	
Rainy season	172	28.4	63	30.4	
Time of reporting to emergency department					
Within 24 h	542	89.4	59	28.5	<0.0001
Beyond 24 h	64	10.6	148	71.5	
The assailant (relationship)					
Stranger	378	62.4	59	28.5	<0.0001
Known	228	37.6	148	71.5	
Number of assailants					
Single	385	63.6	168	81.1	<0.0001
Multiple	221	36.4	39	18.9	
Predisposing factors					
Financial dispute	438	72.3	43	20.8	<0.0001
Intimate partner violence	00	00	111	53.6	
Robbery	63	10.4	31	15	
Eve teasing	32	5.3	00	00	
Police conflicts	39	6.4	07	3.4	
Love affairs	25	4.1	12	5.8	
Non specific	9	1.5	3	1.4	
Place of incident					
Outdoors	566	93.4	22	10.6	<0.0001
Indoors	40	6.6	185	89.4	
Kind of injury[a]					
Blunt trauma	984	74.3	374	86.9	<0.0001
Stab	152	11.5	16	3.8	
Incised	150	11.3	40	9.3	
Chops	23	1.7	00	00	
Firearms	16	1.2	00	00	
Site of injury[a]					
Head neck face	406	37	185	55.4	<0.0001
Chest	148	13.6	15	4.4	
Abdomen	103	9.4	11	3.3	
Upper limb	334	30.4	111	33.3	
Lower limb	95	8.6	12	3.6	
Genital region	11	1	00	00	
Kind of weapon[a]					
Hard and blunt	385	53	183	76.6	<0.0001
Sharp	150	20.6	40	16.7	
Pointed	152	20.9	16	6.7	
Heavy cutting	23	3.2	00	00	
Firearms	16	2.2	00	00	

[a] Note: Kind of injury, Site of injury and kind of weapon outnumbered total number of victims as 570 victims had received multiple types of injuries, 535 victims were injured at multiple anatomical sites and 137 victims were attacked with more than one weapon.

3.5. Intention behind assault

Financial dispute was by far the most common predisposing factor for the male ($n = 438$, 72.3%) victims while for females ($n = 111$, 53.6%) it was intimate partner violence ($p < 0.0001$). Other factors being robbery, conflicts with police, eve teasing and love affairs. Nine males and three females stated some non specific predisposing factors.

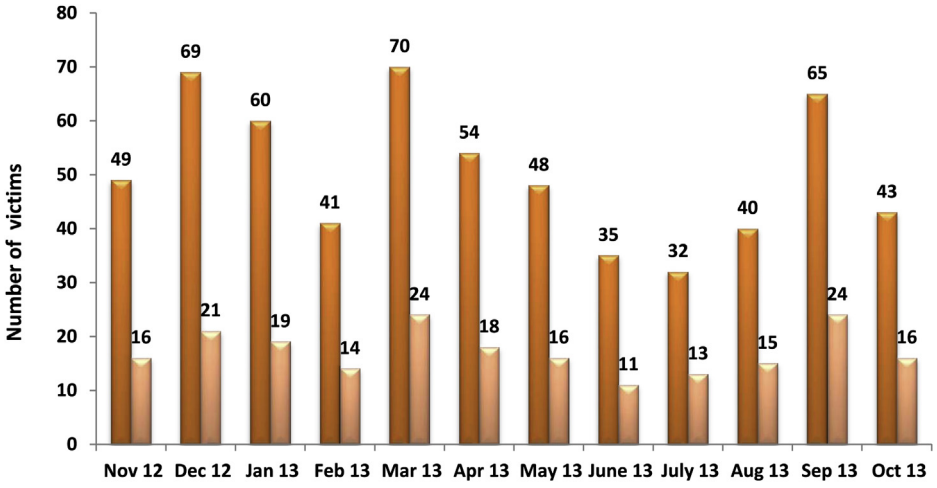

Fig. 1. Victims presenting to the emergency department each month.

3.6. Place of incident

Majority of the males were attacked outdoors ($n = 566$, 93.4%) most commonly on streets while females ($n = 185$, 89.4%) were attacked at homes ($p < 0.0001$). Of the incidents that had occurred outdoors majority occurred at night ($n = 356$, 60.5%) as did for indoor incidents ($n = 127$, 56.4%) ($p = 0.324$). Five male victims were not able to recollect the place where they were attacked (Fig. 2).

3.7. Kind of injuries

Objective assessment of injuries revealed that blunt trauma was more prevalent both in male (74.2%) and female (87%) victims ($p < 0.0001$). This implies that blunt trauma was more commonly seen in females as compared to males.

3.8. Site of injury

Head neck and face region was the most commonly injured anatomical site both in male (37%) and female (55.4%) victims ($p < 0.001$). Upper limbs were injured in 334 (30.44%) males and 111 (33.23%) females. It is not surprising that the total number of cases is outnumbered by the number of types of injuries sustained as 570 cases suffered injuries at multiple sites.

3.9. Kind of weapon

It was noted that hard and blunt weapons were used more commonly against female ($n = 183$, 76.6%) than male ($n = 385$, 53%) victims ($p < 0.0001$). Firearms and heavy cutting weapons were rarely used. Hard and blunt weapons were used more commonly at homes (184 of 269 incidents) than at streets (301 of 561 incidents). Sharp edged and pointed weapons were most commonly used at streets (Table 2). When the seasonal variations in the rate of use of hard and blunt weapons were analyzed using Chi squared test for linear trends no statistically significant results were obtained ($p = 0.4357$) (Fig. 3). Total number of weapons used exceeded total number of victims as in 137 cases multiple weapons were used.

3.10. Alcohol

History of alcohol consumption and objective smell of alcohol was found positive in 444 (54.61%) victims of total 813 victims examined in this study.

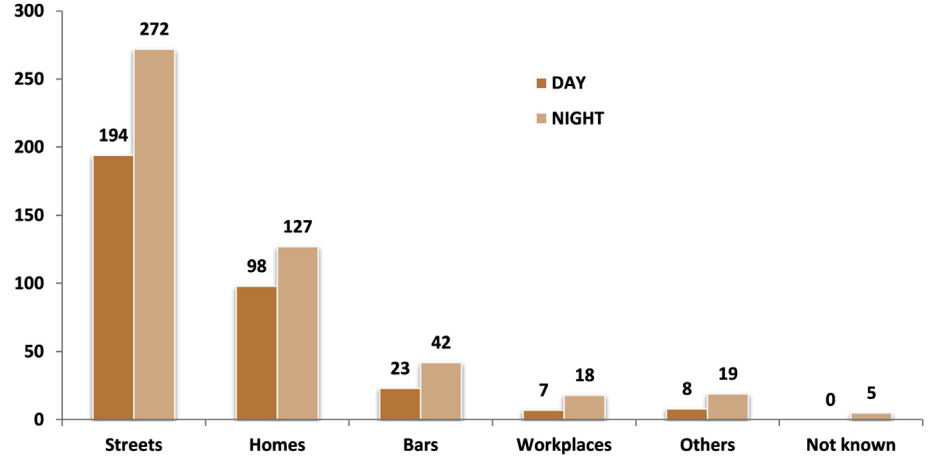

Fig. 2. Number of victims injured at different locations during day and night hours.

Table 2
Place of occurrence and weapons used in assault.

Place of occurrence	Kind of the weapon used					Total
	Hard blunt	Sharp	Pointed	Heavy cutting	Firearms	
Streets	301	117	111	18	14	561
Homes	184	55	30	00	00	269
Bars	41	13	18	01	00	73
Workplaces	20	04	03	02	01	30
Others	20	03	04	02	01	30
Not known	02	02	02	00	00	06
Total	568	194	168	23	16	–

4. Discussion

WHO report of 2002 on violence states that interpersonal violence leads to premature mortality and 90% of this mortality occurs in the low and middle income countries. With the launch of the WHO report, there is growing recognition of the necessity to have a surveillance system in place as the first step in the effort to control violence and its consequences.[6] When interpreting these statistical results it is important to know that visibly noticeable injuries sustained as a result of violent offenses often function as a prerequisite for obtaining medico-legal care in India. Hence, the results of this study may not provide adequate insight into the true extent and epidemiology of the perpetrator–victim constellation and the prevalence of violence. However, our results and analysis may allow for a comparison of injury patterns typically associated with specific violent crimes.

In accordance to other studies,[7–10] majority of the victims were young males aged between 16 and 45 years and were most commonly attacked at night.[11,12] This being the most productive age group gives an indication about the socio-economic implications of violence on the family and society, more so in a developing country like India. In contrast to male victims, the reporting of females to the emergency departments was often delayed ($P < 0.0001$). This may be due to the fact that most of females will conceal true nature and cause of their injuries through fear, embarrassment or feeling of isolation despite being given the opportunity to discuss it. In consistence with the previous studies[8,13–18] males were common victims of stranger perpetrated assaults on streets whereas females were most commonly victimized by spouse at homes ($p < 0.0001$). In the local Indian scenario males are bread winners for the family and are hence more active outdoors while most of the females being housewives are subjected to domestic violence either by spouse or in-laws.

The predominance of blunt trauma injuries ($p < 0.0001$) in this study indicates that the incidence of interpersonal violence is increasing in a developing country like India and the assailants are currently inclined towards using hard and blunt weapons in attacking their victims. The reasons behind these may be either the easy availability of the blunt objects or the penal laws in this part of the world where in causing injury with a sharp or cutting weapon amounts to more rigorous punishment.[19]

Similar to previous studies[3,8,20,21] use of hard and blunt objects more frequently against the women ($p < 0.0001$) signifies the fact that a male assailant tends to choose blunt weapon in preference to sharp one while assaulting a woman because he doesn't wish to cause permanent disability or because he believes that he doesn't need a weapon in a conflict with a woman because she is less stronger. Alternatively in assaults involving only men, sharp weapons may be used to gain advantage over an opponent of roughly equal strength thereby producing more open and penetrating wounds. However, Gayford's[22] suggests that men spontaneously use any weapon which is to hand. Clearly there is an element of weapon selection in domestic violence because knives are also readily available yet are used infrequently. If the hypothesis that little or no injury is intended is correct then the observation that the battering husbands appear particularly polite and concerned when they bring their wives may simply bring their true feelings of remorse and not represent an attempt to conceal the cause of injury.

The high incidence of the craniofacial injuries is striking. Proportionately, craniofacial injuries were more common in female (55.4%) than in male (37%) victims ($p < 0.0001$). In previous comparative studies of injuries in adult assault victims a preponderance of facial wounds was found.[8,9,20,21,23]

5. Conclusion

Young males are most common victims of interpersonal violence. They are often attacked on streets at night, by a single, stranger male while females are usual victims of domestic violence.

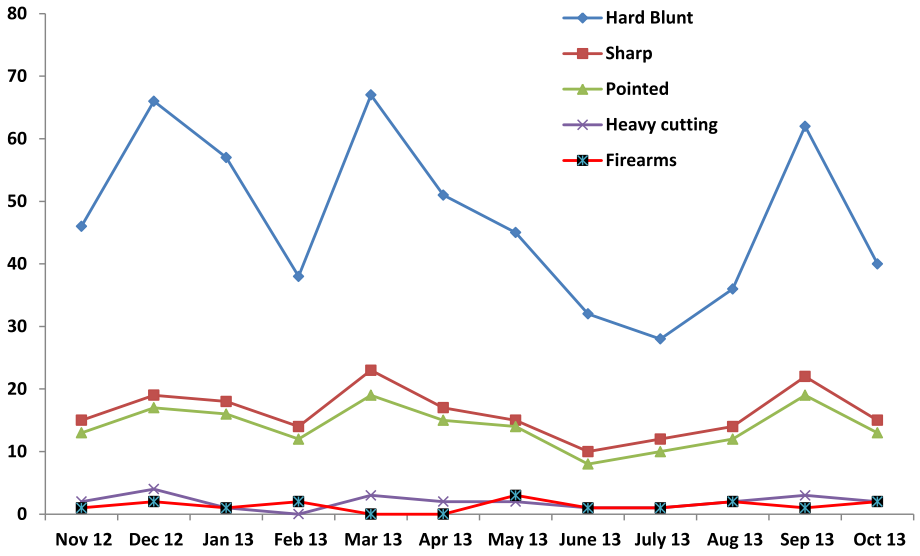

Fig. 3. Various kinds of weapons used for assaults each month.

Injury certification and treatment of female victims is usually delayed due to late reporting. Perpetrators prefer blunt weapons and target head neck face regions of the victims. Hard and blunt weapons are predominantly used indoors on females than outdoors on males. More than half of the violent episodes on male victims are associated with alcohol consumption by them. Occurrence of physical assaults in this region more or less follows the pattern seen in other parts of the world with local and socio-cultural differences that need to be further delved into and considered during the planning and implementation of injury prevention programs.

Ethical approval

Not required.

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Conflict of interest

None declared.

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